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**AQUATIC INVERTEBRATES AND HABITAT AT A FIXED  
STATION ON THE MILK RIVER,  
VALLEY COUNTY, MONTANA**

September 14, 2001

A report to  
the Montana Department of Environmental Quality  
Helena, Montana

by  
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May 2002

## INTRODUCTION

This report is one of 38 brief interpretive summaries of data assembled as part of a statewide, multi-year study conducted by the Montana Department of Environmental Quality (MT DEQ). Each report discusses information generated from a single benthic invertebrate sample collection and habitat evaluation at a fixed station established on a gauged river or high-order tributary. The present treatise focuses on the aquatic community sampled on the Milk River at Nashua, Montana on September 14, 2001. The sample site was located by GPS reading at 48° 07' 48" N, 106° 21' 57" W, lying within the Northwestern Glaciated Plains Ecoregion (Woods et al. 1998). The sample was collected by personnel of MT DEQ. Sampling effort consisted of either a composite of four Hess samples, or a one-minute kicknet collection (Bukantis 1998). Habitat parameters were evaluated using the MT DEQ Macroinvertebrate Habitat Assessment Field Form for streams with riffle/run prevalence. Invertebrate samples were processed and animals identified by Rhithron Associates, Inc. Analysis of invertebrate assemblages was accomplished by applying the method recommended by Bukantis (1998) for streams of Montana's Plains ecoregions. The method uses a multimetric battery to evaluate disturbance to biotic integrity. Results from the application of other metric batteries may be found in the Appendix.

## RESULTS AND DISCUSSION

Table 1 itemizes the evaluated habitat parameters and shows the assigned scores for each, as well as the integrated score and condition category.

Overall habitat conditions scored sub-optimally at this site on the Milk River. The benthic substrate was perceived to be somewhat more monotonous than expected. Some sediment deposition was noted, and substrate particles were shallowly embedded. Flow was judged sub-optimal. Streambanks were moderately stable, and the riparian zone width was abbreviated on both banks.

**Table 1.** Stream and riparian habitat assessment for a fixed station on the Milk River. September, 2001.

Max. possible score	Parameter	Milk River at Nashua
10	Riffle development	9
10	Benthic substrate	7
20	Embeddedness	11
20	Channel alteration	15
20	Sediment deposition	14
20	Channel flow status	12
20	Bank stability: left / right	8 / 8
20	Bank vegetation: left / right	9 / 9
20	Vegetated zone: left / right	8 / 8
160	Total	118
	Percent of maximum CONDITION*	74 <b>SUB-OPTIMAL</b>

\*Condition categories: Optimal (OPT) > 80% of maximum score; Sub-optimal (SUB) ; 75 - 56%; Marginal (MARG) 49 - 29%; Poor <23%. Adapted from Plafkin et al. 1998.

**Table 2.** Metric values, scores, and bioassessment for a fixed station on the Milk River. The Montana DEQ bioassessment metric battery recommended for streams of the Plains ecoregions (Bukantis 1998) was used for the evaluation. September 2001.

Milk River at Nashua		
METRICS	METRIC VALUES	METRIC SCORES
Taxa richness	11	0
EPT richness	5	1
Biotic index	5.03	2
% Dominant taxon	80.43	0
% Collectors	95.11	0
% EPT	89.91	3
Shannon diversity	1.29	0
% Scrapers and Shredders	4.28	1
Predator taxa	1	0
% Multivoltine	28.90	3
	<b>TOTAL SCORE (max.=30)</b>	10
	<b>PERCENT OF MAX.</b>	33
	<b>Impairment classification</b>	<b>MODERATE</b>
	<b>USE SUPPORT</b>	<b>PARTIAL</b>

Bioassessment results are given in Table 2. When this bioassessment method is applied to these data, scores indicate that this site on the Milk River is moderately impaired and only partially supports designated uses.

The biotic index value (5.03) is slightly elevated over expectations, and only 2 mayfly taxa were collected in the sample. While the mayflies present were intolerant types, they were not abundant, representing only 5% of the assemblage. Thus, information about water quality is equivocal.

The sample was overwhelmed by a tolerant caddisfly, *Cheumatopsyche* sp., which comprised 80% of organisms. Functional attributes of the community were thus skewed toward filter-feeders, implying that large quantities of fine suspended organic material were available to support these creatures. Abundant filter-feeders can frequently be found below senescent beds of filamentous algae; large patches of *Cladophora* sp. were described in field observations. The dearth of predator taxa (a single individual was present in the sample) and low taxa richness suggests that benthic habitats were monotonous. The only habitat type that was apparently in good supply was hard substrate surfaces, which were probably unaffected by fine sediment deposition, since 97% of organisms present were "clingers".

## CONCLUSIONS

- Water quality indicators gave equivocal results, but the possibility of nutrient enrichment cannot be excluded.

- Monotonous instream habitats may have resulted in the low taxa richness at this site. Hard substrate surfaces appear to have been the only prolific habitat type available.
- Abundant filter-feeders were likely supported by senescent beds of filamentous algae, observed by the field evaluators.
- The bioassessment method employed here delivered a result (moderate impairment) consistent with interpretation of the taxonomic data.

## LITERATURE CITED

- Bukantis, R. 1998. Rapid bioassessment macroinvertebrate protocols: Sampling and sample analysis SOP's. Working draft. April 22, 1997. Montana Department of Environmental Quality. Planning Prevention and Assistance Division. Helena, Montana.
- Woods, A.J., Omernik, J. M. Nesser, J.A., Shelden, J., and Azevedo, S. H. 1999. Ecoregions of Montana. (Color poster with map, descriptive text, summary tables, and photographs) Reston, Virginia. US Geological Survey.

## **APPENDIX**

**Taxonomic data and summaries**

**Milk River**

**September 2001**

## Aquatic Invertebrate Taxonomic Data

<b>Site Name:</b> Milk River at Nashua	<b>Date:</b> 9/14/01			
<b>Site ID:</b> M45MILKR01	Approx. percent of sample used: 4			
Taxon	Quantity	Percent	HBI	FFG
<i>Centroptilum</i> sp.	7	2.14	2	CG
<i>Stenonema</i> sp.	10	3.06	3.5	SC
<b>Total Ephemeroptera</b>	<b>17</b>	<b>5.20</b>		
<i>Cheumatopsyche</i> sp.	263	80.43	5	CF
<i>Hydropsyche</i> sp.	13	3.98	5	CF
<i>Hydroptila</i> sp.	1	0.31	6	PH
<b>Total Trichoptera</b>	<b>277</b>	<b>84.71</b>		
<i>Simulium</i> sp.	7	2.14	5	CF
<b>Total Diptera</b>	<b>7</b>	<b>2.14</b>		
<i>Cricotopus Bicinctus</i> Gr.	8	2.45	7	CG
<i>Cricotopus Trifascia</i> Gr.	12	3.67	7	CG
<i>Polyphemidium</i> sp.	4	1.22	6	SH
<i>Thienemanniomyia</i> Gr.	1	0.31	5	PR
<i>Tvetenia</i> sp.	1	0.31	5	CG
<b>Total Chironomidae</b>	<b>26</b>	<b>7.95</b>		
<b>Grand Total</b>	<b>327</b>	<b>100.00</b>		

### Aquatic Invertebrate Summary

Site Name: Milk River at Nashua

Date: 9/14/01

SAMPLE TOTAL 327

EPT abundance  
TAXA RICHNESS  
Number EPT taxa  
Percent EPT

294  
11  
5  
89.91

### TAXONOMIC COMPOSITION

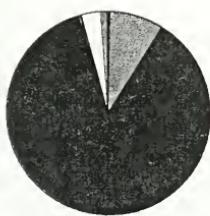
GROUP	PERCENT	#TAXA	ABUNDANCE
Misc Taxa	0.00	0	0
Odonata	0.00	0	0
Ephemeroptera	5.20	2	17
Plecoptera	0.00	0	0
Hemiptera	0.00	0	0
Megaloptera	0.00	0	0
Trichoptera	84.71	3	277
Lepidoptera	0.00	0	0
Coleoptera	0.00	0	0
Diptera	2.14	1	7
Chironomidae	7.95	5	26



### FUNCTIONAL COMPOSITION

GROUP	PERCENT	#TAXA	ABUNDANCE
Predator	0.31	1	1
Parasite	0.00	0	0
Gatherer	8.56	4	28
Filterer	86.54	3	283
Herbivore	0.00	0	0
Piercer	0.31	1	1
Scraper	3.06	1	10
Shredder	1.22	1	4
Xylophage	0.00	0	0
Omnivore	0.00	0	0
Unknown	0.00	0	0

- Predator
- Parasite
- Gatherer
- Filterer
- Herbivore
- Piercer
- Scraper
- Shredder
- Xylophage
- Omnivore
- Unknown



### COMMUNITY TOLERANCES

Sediment tolerant taxa 0  
Percent sediment tolerant 0.00  
Sediment sensitive taxa 0  
Percent sediment sensitive 0.00  
Metals tolerance index (McGuire) 4.75  
Cold stenotherm taxa 0  
Percent cold stenotherms 0.00

Site ID: M45MILKR01

### DOMINANCE

TAXON	ABUNDANCE	PERCENT
<i>Cheumatopsyche</i> sp	263	80.43
<i>Hydropsyche</i> sp	13	3.98
<i>Cricotopus Trifascia</i> Gr	12	3.67
<i>Stenonema</i> sp	10	3.06
<i>Cricotopus Bauculus</i> Gr	8	2.45
SUBTOTAL 5 DOMINANTS	306	93.58
<i>Centroptilum</i> sp	7	2.14
<i>Simulium</i> sp	7	2.14
<i>Polycentrum</i> sp	4	1.22
<i>Hydropsyche</i> sp	1	0.31
<i>Thienemanniella</i> Gr	1	0.31
TOTAL DOMINANTS	326	99.69

### SAPROBITY

Hilsenhoff Biotic Index

### DIVERSITY

Shannon H (loge)

Shannon H (log2)

Simpson D

#DIV/0!

### VOLITISM

TYPE	ABUNDANCE	PERCENT
Multivoltine	95	28.90
Univoltine	233	71.10
Semivoltine	0	0.00

### TAXA CHARACTERS

#TAXA	ABUNDANCE	PERCENT
Tolerant	4	281
Intolerant	0	0.00
Clinger	8	318

### BIOASSESSMENT INDICES

B-IBI (Karr et al.)	VALUE	SCORE
Taxa richness	11	1
E richness	2	1
P richness	0	1
T richness	3	1
Long-lived	0	1
Sensitive richness	0	1
%tolerant	85.93	1
%predators	0.31	1
Clinger richness	8	1
%dominance (3)	88.07	1

TOTAL SCORE 10 20 %

### MONTANA DEQ METRICS (Bukantis 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	11	0	0	0
EPT richness	5	1	0	0
Biotic Index	5.03	2	1	0
%Dominant taxon	80.43	0	0	0
%Collectors	95.11	0	0	0
%EPT	89.91	3	3	3
Shannon Diversity	1.29	0	0	0
%Scrapers + Shredders	4.28	1	0	0
Predator taxa	1	0	0	0
%Multivoltine	28.90	3	0	0
%Id of T	99.6	0	0	0
TOTAL SCORES	10	4	3	3
PERCENT OF MAXIMUM	33.33	16.67	14.29	14.29
IMPAIRMENT CLASS	MODERATE	SEVERE	SEVERE	SEVERE

### Montana DEQ metric batteens



